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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,250	03/30/2004	Michael A. Schultz	108524	4825

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EXAMINER	
DOUGLAS, JOHN CHRISTOPHER	
ART UNIT	**PAPER NUMBER**
1764	

MAIL DATE	DELIVERY MODE
06/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/813,250	SCHULTZ ET AL.	
	Examiner	Art Unit	
	John C. Douglas	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-8,11,23,24 and 27-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-8,11,23,24 and 27-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Examiner acknowledges the response filed on 3/22/2007 containing remarks and amendments to the claims. Examiner acknowledges that the previously cancelled claims 1, 2, 9, 10, 12-22, 25 and 26 are re-presented as new claims 28, 29, 30, 31, 32-42, 43, and 44, respectively.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 28, 29, 3-8, 31 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy (US 2002/0009404) in view of Bal (US 6482316).

2. With respect to claims 28, 3, and 4, Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

3. With respect to claims 29 and 11, Tsybulevskiy discloses desulfurizing a diesel duel with an adsorbent (see Tsybulevskiy, paragraph 16).

4. With respect to claim 5, Tsybulevskiy discloses an absorbent that has an adsorption capacity of 0.62 wt% for a sulfoxide (see Tsybulevskiy, example 11, Table 4).

5. With respect to claim 6, Tsybulevskiy discloses where the adsorption contacting step is conducted at temperatures in the range of 10to 40 degrees C and pressures in the range of 300 to 6000 kPa (3 to 60 bars) (see Tsybulevskiy, paragraph 48).

6. With respect to claim 7, Bal discloses where the desorbent is introduced at temperatures between about 27 degrees C to about 400 degree C (see Bal, column 3, lines 21-25).

7. With respect to claim 8, Bal discloses where the desorbent is toluene (see Bal, column 3, lines 46-51).

8. With respect to claim 31, Bal discloses recycling the desorbent to the desorbing step (see Bal, column 1, lines 43-53).

9. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal as applied to claim 28 above, and further in view of Rice (US 6395950). Tsybulevskiy in view of Bal disclose everything in claim 28, but do not disclose where the fractionating step is conducted in a split shell fractionation step.

Rice discloses a fractionation zone with a vertical partition (see Rice, column 18, lines 23-45).

Rice discloses that such a distillation column with a vertical partition reduces capital costs as well as utility costs when compared to a traditional distillation column (see Rice, column 16, lines 26-43).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy in view of Bal to include a fractionation zone with a vertical partition in order to save on capital costs and utility costs.

10. Claims 32-39, 41, 42, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels (US 4354929).

11. With respect to claims 32, 34, 35, 23, and 24, Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon

stream containing sulfur, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

In addition, Wessels discloses the use of n-hexane as a purge to sweep out hydrocarbons from the adsorbent (see Wessels, column 1, lines 21-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include the use of n-hexane as a purge in order to sweep out hydrocarbons from the adsorbent.

12. With respect to claims 33 and 42, Tsybulveskiy discloses desulfurizing a diesel duel with an adsorbent (see Tsybulveskiy, paragraph 16).

13. With respect to claim 36, Tsybulevskiy discloses an absorbent that has an adsorption capacity of 0.62 wt% for a sulfoxide (see Tsybulevskiy, example 11, Table 4).

14. With respect to claim 37, Tsybulevskiy discloses where the adsorption contacting step is conducted at temperatures in the range of 10to 40 degrees C and pressures in the range of 300 to 6000 kPa (3 to 60 bars) (see Tsybulevskiy, paragraph 48).

15. With respect to claim 38, Bal discloses where the desorbent is introduced at temperatures between about 27 degrees C to about 400 degree C (see Bal, column 3, lines 21-25).

16. With respect to claim 39, Bal discloses where the desorbent is toluene (see Bal, column 3, lines 46-51).

17. With respect to claim 41, Bal discloses recycling the desorbent to the desorbing step (see Bal, column 1, lines 43-53).

18. Claims 40, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels as applied to claim 32 above, and further in view of Rice (US 6395950).

19. With respect to claim 40, Tsybulevskiy in view of Bal disclose everything in claim 28, but do not disclose where the fractionating step is conducted in a split shell fractionation step.

Rice discloses a fractionation zone with a vertical partition (see Rice, column 18, lines 23-45).

Rice discloses that such a distillation column with a vertical partition reduces capital costs as well as utility costs when compared to a traditional distillation column (see Rice, column 16, lines 26-43).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy in view of Bal and Wessels to include a fractionation zone with a vertical partition in order to save on capital costs and utility costs.

20. With respect to claims 43 and 44, Wessels discloses where the n-hexane purge is fractionated to produce an n-hexane overhead fraction that is recycled for use as purge gas (see Wessels, column 2, lines 10-23).

21. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels. Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

In addition, Wessels discloses the use of n-hexane as a purge to sweep out hydrocarbons from the adsorbent (see Wessels, column 1, lines 21-27). Wessels also discloses where the n-hexane purge is fractionated to produce an n-hexane overhead fraction that is recycled for use as purge gas (see Wessels, column 2, lines 10-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include the use of n-hexane as a purge in order to sweep out hydrocarbons from the adsorbent.

Response to Arguments

Applicant first argues that there is no motivation to combine Tsybulevskiy with Bal because Tsybulevskiy discloses where the hydrocarbon stream is treated in a gaseous phase and Bal discloses uses a liquid desorbent that has the same boiling range as the feed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., whether the feed and/or the desorbent are in the liquid or gaseous phase) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Bal discloses that the desorbent is effective to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Applicant's second argument is that Bal requires additional steps to separate the sulfur from the desorbent, which are not required in Tsybulevskiy. Regard less of any additional steps, however, Bal discloses that the desorbent is effective to regenerate an adsorbent (see Bal, column 1, lines 60-65).

Applicant's third argument is that there is no teaching that a liquid desorbent would be adequate to remove sulfur compounds from the adsorbent of Tsybulevskiy. However, the teachings of Bal disclose that the adsorbents that can be treated consist of zeolites, etc (see Bal, claim3).

Applicant's fourth argument is that there is no motivation to add the desorbent method of Bal, which requires additional steps, to the simple method of Tsybulevskiy. However, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant case, Bal was added to show that it is known in the art to contact an adsorbent with a liquid desorbent.

Applicant's fifth argument is that Tsybulevskiy in view of Bal do not disclose the presence of interstitial hydrocarbons that would lead to the need for the purge step. However, Wessels discloses that interstitial hydrocarbons are present in an adsorbent after processing (see Wessels, column 1, lines 21-27).

Applicant's sixth argument is that there is no need expressed in Tsybulevskiy, Bal, or Wessels to add the column in the Rice patent. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some

teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Rice discloses that such a distillation column with a vertical partition reduces capital costs as well as utility costs when compared to a traditional distillation column (see Rice, column 16, lines 26-43).

Conclusion

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

6/9/2007

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